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NOTES AND LITERATURE.

GENERAL BIOLOGY.

Vernon's Variation.[1]— Mr. H. M. Vernon of Oxford, England, has summarized in a handy octavo volume the most important observations on variation made since the publication of Darwin's great work on *The Variation of Animals and Plants under Domestication.* The book will form a valuable student's manual in the field of general biology. It is clear and concise in style and is remarkably free from technical terms and mathematical formulæ, considering the fact that it deals largely with statistical methods.

It is divided into three parts which treat respectively of "The Facts of Variation," "The Causes of Variation" and "Variation in its Relation to Evolution."

Part I includes a brief explanation of the statistical methods employed in the study of variation, a remarkably clear presentation of the difficult subject of correlated variations, and a discussion of dimorphism and discontinuous variation, in which the ideas of Bateson and de Vries receive special attention.

Part II treats of the effects on organisms of external conditions, such as temperature, light and moisture, a subject discussed more exhaustively by Davenport in his *Experimental Morphology* and by Verworn in his *Allgemeine Physiologie.* Two chapters devoted to blastogenic variations contain, along with much other material, an account of important experiments made by the author in the hybridization of various species of echinoderms. Accepting as probably correct the idea of Weismann that variations which are hereditary are of germinal origin, Vernon believes that the heritage borne by the germ-cell is not at all periods of its existence the same, but that it changes as the germ-cell changes in maturity. Thus when two species of echinoderm are crossed, which ordinarily breed at different seasons of the year, that species impresses its characters most strongly on the offspring which is (at the time the cross is made) nearest the height of its breeding season. This conclusion is based on the averages of large series of measurements of hybrid offspring, but is very probably vitiated by the occurrence of artificial parthenogenesis so easily produced in the case of echinoderm eggs. Another series of experiments cited by Vernon in support of his view is hardly more convincing. It consists in experiments made by Ewart with mating rabbits early or late in rut.

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[1] Vernon, H. M. *Variation in Animals and Plants.* 8vo., ix + 415 pp., 30 figs. New York, Henry Holt and Co., 1903.

"Mendel's Law" is treated as a law of "hybridization" only, its profound significance as a general law of heredity being unnoticed, while the Galton-Pearson "Law of Ancestral Heredity" is treated as *the* law of heredity. To many biologists the evidence for the Mendelian principles is too strong and too clearly counter to the Galton-Pearson law to be thus lightly brushed aside. It also raises a strong presumption against Vernon's idea of a heritage *gradually* changing during the ripening of the sexual products.

Part III, contains a brief survey of a familiar field. Natural selection is recognized as the efficient agency in evolution. Adaptive variations are discussed at some length and the evidence for and against their inheritance are considered. Environment is regarded as directly inducing germinal variation. W. E. C.

PHYSIOLOGY.

Von Fürth's Comparative Chemical Physiology of the Lower Animals.[1] — Perhaps the most important general advance made by physiology in the last ten years has been the inclusion of the lower animals within its field of research. Just as anatomy was immensely illuminated by a thorough investigation of the structure of the lower forms and thus became truly comparative, so physiology will gain a clearer and more certain insight into life processes by a study of these where they occur in greatest simplicity. What has already been done in this direction especially from the chemical standpoint is scarcely accessible to the student except through the original sources of publication for ever so excellent a book as Verworn's General Physiology passes over this subject most superficially. Von

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[1] Fürth, O. von. *Vergleichende chemische Physiologie der niederen Tiere.* Jena, Fischer, 1903. 8vo., xiv + 670 pp.